July 19, 2002
AET 02-0005

Mr. Martin J. Virgilio
Director, Office of Nuclear Material Safety and Safeguards
Attention: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Submittal of Gas Centrifuge Quality Assurance Program Description
Docket No. 70-7003

Dear Mr. Virgilio,

The purpose of this letter is to submit the attached Quality Assurance Program Description (QAPD) to the Nuclear Regulatory Commission (NRC) for review and approval. As stated in a meeting with the NRC on April 11, 2002, USEC is submitting the QAPD in support of the License Application for the Gas Centrifuge Lead Cascade facility, which USEC plans to submit to the NRC by the end of 2002.

The QAPD is applicable to the design, fabrication, construction, testing, operation, and modification of centrifuge uranium enrichment technology by USEC. The level of detail in the QAPD is consistent with a QAPD previously approved by the NRC in the Reference and complies to requirements of 10 CFR Part 70. USEC is submitting the QAPD in advance of the licensing application so that more engineering work and material procurement in support of the Lead Cascade can be performed under an approved program. After the NRC staff has had an opportunity to review the QAPD, USEC is ready to support a meeting with the NRC to address questions or clarify issues to reduce or eliminate the need for a Request for Additional Information.

If you have any questions on this matter, please contact Mario Robles at (301) 564-3408.

Sincerely,

S. A. Toelle

Steven A. Toelle
Director, Nuclear Regulatory Affairs

Reference: Letter from Robert C. Pierson (USNRC) to Robert Woolley (USEC), "AVLIS Quality Assurance Program Description," dated June 18, 1998.

cc: J. Glitter, NRC HQ
T. Johnson, NRC HQ (3 copies)

NMSS01
Public

USEC Inc.
6903 Rockledge Drive, Bethesda, MD 20817-1818
Telephone 301-564-3200 Fax 301-564-3201 http://www.usec.com

QUALITY ASSURANCE PROGRAM DESCRIPTION (QAPD)
AET 02-0005

Docket No. 070-7003

USEC Inc.

Gas Centrifuge
Quality Assurance Program Description

Revision 0

USEC INC.

GAS CENTRIFUGE
QUALITY ASSURANCE PROGRAM DESCRIPTION

TABLE OF CONTENTS

INTRODUCTION

The Quality Assurance Program Description (QAPD) described herein applies to the design, fabrication, construction, testing, operation, and modification of USEC Inc. (USEC) gas centrifuge Lead Cascade Project and meets 10 CFR 70.64 (a)(1). Only the applicable elements of this program are implemented during the Lead Cascade Project.

The Lead Cascade Project will be implemented at one of the USEC gaseous diffusion plant (GDP) sites. Although site selection has not been completed, this QAPD is applicable regardless of which GDP is selected. The site of the Lead Cascade is referred to as the host GDP.

The QAPD is applied using a graded approach as described in Section 2.

SECTION 1 ORGANIZATION

1. USEC maintains overall responsibility for design, fabrication, construction, testing, operation, and modification as the owner of the Lead Cascade.

2. The USEC Lead Cascade organization has been established utilizing resources from within USEC, supplemented by consultants where appropriate. The organization structure is different for the design, construction, and start-up phase than the operations phase of the Lead Cascade Project. Figure 1 shows the organization for the design, construction, and start-up phase. Figure 2 shows the organization for the operations phase of the Lead Cascade Project.

Lead Cascade Design, Construction, and Start-up Organization

1. The Executive Vice President and Chief Operating Officer has overall responsibility for the design, construction, start-up and operation of the Lead Cascade and reports to the President and Chief Executive Officer.

2. The Executive Vice President and Chief Operating Officer has designated the Director, Enrichment Technology responsible for design, construction, start-up and associated support activities for the Lead Cascade Project. The Manager, Nuclear Safety and Quality has oversight responsibility for implementation of the QAPD.

3. The Director, Enrichment Technology is responsible for the overall Lead Cascade Project, including headquarters support for the project and overall responsibility for implementation of the QAPD. The QAPD is binding on all USEC and project personnel involved with the Lead Cascade Project.

4. The Manager, Lead Cascade Project reports to the Director, Enrichment Technology and has day-to-day responsibility for development, design, construction, and startup of the Lead Cascade at the host GDP. This includes on-site implementation of the QAPD for the project.

5. The manager responsible for engineering is responsible for site characterization, plant design and the design control process, configuration management, engineering and construction contract management, and acceptance test coordination, including test control. This manager is also responsible for nuclear criticality safety, safety analysis, procurement, and project management.

6. The manager responsible for operations and maintenance is responsible for operational input to the Lead Cascade design, planning the operating staff and the transition from construction and testing to operation of the Lead Cascade. This includes centrifuge check out, integrated system testing, and inspection, test and operating status of the Lead Cascade. This manager is also responsible for: maintenance and machine assembly, integrated planning and scheduling, operations analysis, control of special processes, and the measuring and test equipment (M&TE) process.

7. The manager responsible for procurement, who reports functionally to the corporate manager responsible for procurement and materials, is responsible for providing procurement material control services including supplier qualification coordination, purchasing, contracting, receiving and control of nonconforming items, and material control including handling, storage and shipping. This manager is also responsible for supply strategy and development of qualified long-lead-time and complex-system suppliers.

8. The manager responsible for nuclear regulatory policy and licensing is responsible for Lead Cascade licensing, environmental safety and health, security and safeguards, and industrial hygiene. This manager is also responsible for the corrective action program.

9. The manager responsible for training is responsible for development and implementation of programs for indoctrination and training identified in Section 2 of this QAPD. Also, this manager is responsible for the process for development, review, approval, and issuance of procedures, the process for control of documents, and the process for storage of records.

10. The Manager, Nuclear Safety and Quality at the host GDP is responsible for independent oversight of plant activities covered by this QAPD. This includes maintenance of the QAPD and assessing its effective implementation.

    This includes the responsibility and authority for:

    a. Formulating the QAPD documented in the Gas Centrifuge Quality Assurance Program Description;
    b. Review and approval of contractor quality assurance (QA) programs;
    c. Monitoring the implementation of the QAPD;
    d. Investigating any aspect of the QAPD to identify problems with execution and to verify that corrective action is taken in a timely manner; and
    e. Stopping unsatisfactory work or controlling further processing when warranted for safety considerations.

11. The Manager, Quality Services is responsible for day-to-day quality assurance and quality control activities for design, construction and start-up of the Lead Cascade. This includes implementation of the QA program and responsibility and authority for:

    a. Reviewing and approving QAPD implementing procedures;
    b. Implementing the QA audit program and assessing the effectiveness of the QAPD;
    c. Attending status meetings, and staying abreast of day-to-day activities to ensure adequate oversight;
    d. Quality control activities for purchased items; and
    e. Stopping unsatisfactory work or controlling further processing when warranted for safety considerations.

12. The organizational philosophy is based on the following principles:

a. Quality is achieved by those responsible for performing work. This includes identifying, correcting, or recommending solutions for quality problems.
b. Quality verification and control are performed by persons who are independent of the work performance activities, but who may report to the management of the same organization. Persons responsible for assurance and verification of quality have sufficient organizational freedom to identify problems, initiate solutions, verify solutions and control further processing when necessary.
c. Quality related activities may be delegated to others but responsibility for overall effectiveness of the QAPD is retained by USEC Lead Cascade management.
d. Suppliers and contractors are required to have QA programs consistent with USEC's QA program, as applicable to the scope of work as specified in Section 7.

13. Specific organizational responsibilities are defined in the implementing procedures developed and implemented in accordance with Section 5.

Lead Cascade Operations Organization

1. The Executive Vice President and Chief Operating Officer has overall responsibility for the operations and associated support activities for the Lead Cascade Project. The Vice President, Operations has oversight responsibility for the QAPD with the Manager, Nuclear Safety and Quality reporting directly.

2. The Executive Vice President and Chief Operating Officer has designated the Director, Enrichment Technology responsible for associated support activities for the Lead Cascade Project. The Manager, Nuclear Safety and Quality has oversight responsibility for implementation of the QAPD.

3. The Director, Enrichment Technology is responsible for the overall Lead Cascade Project, including headquarters support for the project and overall responsibility for implementation of the QAPD. The QAPD is binding on all USEC and project personnel involved with the Lead Cascade Project.

4. The Manager, Lead Cascade Project reports to the Director, Enrichment Technology and has day-to-day responsibility for operation of the Lead Cascade at the host GDP, including on-site implementation of the QAPD during operation.

5. The manager responsible for engineering is responsible for plant design and the design control process, configuration management, engineering support of operation, and acceptance test coordination, including test control. This manager is also responsible for nuclear criticality safety, safety analysis, and procurement.

6. The manager responsible for operations and maintenance is responsible for Lead Cascade operations. This manager is also responsible for maintenance and machine assembly, integrated planning and scheduling, operations analysis, and inspection, test, and operating status of the cascade.

7. The manager responsible for procurement, who reports functionally to the corporate manager responsible for procurement and materials, is responsible for providing procurement material control services including supplier qualification coordination, purchasing, receiving and control of nonconforming items, and material control including handling, storage and shipping.

8. The manager responsible for nuclear regulatory policy and licensing is responsible for the gas centrifuge Lead Cascade licensing, environmental safety and health, security and safeguards, and industrial hygiene. This manager is also responsible for the corrective action program.

9. The Manager, Nuclear Safety and Quality is responsible for independent oversight of plant activities covered by this QAPD. This includes implementation of the QAPD for Lead Cascade Project and maintenance of the QAPD and assessing its effective implementation during operations. This includes the responsibility and authority for:

   a. Review and approval of QAPD implementing procedures;
   b. Review and approval of supplier QA programs;
   c. Assessing the effectiveness of the QAPD;
   d. Monitoring QAPD implementation, attending status meetings, and staying abreast of day-to-day activities to ensure adequate oversight;
   e. Quality control including activities for receipt of purchased items;
   f. Investigating any aspect of the QAPD to identify problems with execution and to verify that corrective action is taken in a timely manner; and
   g. Stopping unsatisfactory work or controlling further processing when warranted for safety considerations.

10. The organizational philosophy is based on the following principles:

   a. Quality is achieved by those responsible for performing work. This includes identifying, correcting, or recommending solutions for quality problems.
   b. Quality verification and control are performed by persons who are independent of the work performance activities, but who may report to the management of the same organization. Persons responsible for assurance and verification of quality have sufficient organizational freedom to identify problems, initiate solutions, verify solutions, and control further processing when necessary.
   c. Quality related activities may be delegated to others but responsibility for overall effectiveness of the QAPD is retained by USEC Lead Cascade Project management.
   d. Suppliers and contractors are required to have QA programs, consistent with USEC's QA program as applicable to the scope of work as specified in Section 7.

11. Specific organizational responsibilities are defined in the implementing procedures in accordance with Section 5.

SECTION 2 QUALITY ASSURANCE PROGRAM

1. Quality assurance elements of this section are applied to the design, fabrication, construction, testing, operation, and modification of items relied on for safety (IROFS), and activities affecting those IROFS, to ensure they will be available and reliable to perform their safety function when needed. The QAPD is applied to IROFS in a graded approach to an extent commensurate with their importance to safety. Quality Levels (QL) are established in accordance with their importance to safety as follows:

Level	Criteria
QL-1	Failure or malfunction of a single control or single IROFS could cause a high consequence event as defined by 10 CFR 70.61, "Performance Requirements"
QL-2	Failure or malfunction of two controls or two IROFS could cause a high consequence event as defined by 10 CFR 70.61, "Performance Requirements"; or Failure or malfunction of any control or IROFS could cause an intermediate consequence event as defined by 10 CFR 70.61, "Performance Requirements"
QL-3	Items other than QL-1 and QL-2 that are important to the operational safety of the facility

2. All QAPD requirements apply to QL-1 IROFS. The process for selecting modifications to QA requirements for QL-2 and QL-3 are described below. Non-safety (NS) items (i.e., those items not designated as QL-1, QL-2, or QL-3) are outside the scope of this QAPD. The application of the QAPD is documented, planned, implemented, and maintained to provide reasonable assurance that, together with other management measures, IROFS will be available and reliable when needed.

3. Procedures provide for a graded application of resources taking into consideration:

    a. QL (risk importance);
    b. Applicable regulations, industry codes, and standards;
    c. Complexity or uniqueness of an item or activity and the environment in which it has to function;
    d. Quality history of the item in service;
    e. Degree to which functional compliance can be demonstrated or assessed by test, inspection or maintenance methods;
    f. Anticipated life span;
    g. Degree of standardization;
    h. Importance of data generated;
    i. Reproducibility of results; and
    j. Consequence of failure.

4. By appropriately balancing considerations of importance and process capability, resources are

efficiently applied to achieve the desired benefit.

5. The results of the application of the graded approach to quality are incorporated into design requirement documents, specifications, procedures, instructions, drawings, inspection plans, test plans, procurement documents, and other documents that establish the requirements for items or activities.

6. Compliance with QAPD requirements and associated procedures is mandatory. Questions on QAPD requirements are referred for resolution to the Manager, Nuclear Safety and Quality who is the final authority on QAPD requirements.

7. The terms used in the QAPD are as defined in 10 CFR 70.4, Definitions, and "Introduction" of Part I of ASME NQA-1-1994. The term "design output" as used in this QAPD means "drawings, specifications, and other documents used to define technical requirements of IROFS."

8. Indoctrination and training shall meet the requirements of Supplement 2S-4, "Supplementary Requirements for Personnel Indoctrination and Training" of Part 1 of ASME NQA-1-1994. On-the-job training and formal training are provided as necessary.

9. Quality Control personnel performing inspection and testing shall meet the requirements of Supplement 2S-1, "Supplementary Requirements for the Qualification of Inspection and Test Personnel" of Part 1 of ASME NQA-1-1994.

10. Personnel performing nondestructive examination shall meet the requirements of The American Society for Nondestructive Testing Recommended Practice No. SNT-TC-1A, June 1980 Edition.

11. QA audit personnel shall meet the requirements of Supplement 2S-3, "Supplementary Requirements for the Qualification of Quality Assurance Program Audit Personnel" of Part 1 of ASME NQA-1-1994.

12. Each manager is responsible for the applicable indoctrination, training and qualification of their personnel.

13. Management of those organizations implementing the QAPD, or portions thereof, regularly assess the adequacy of that part of the program for which they are responsible and shall assure its effective implementation.

14. Lead Cascade senior managers regularly assess the adequacy and effective implementation of the QA elements through methods such as project review meetings, audit reports, and corrective action reports.

15. QAPD changes and updates are controlled by 10 CFR 70.72, "Facility Changes and Change Process." QAPD changes may be initiated by events such as reorganizations, revised activities, as a result of lessons learned, changes to applicable regulations, process changes, or other reasons. QAPD changes are governed by approved procedures.

SECTION 3 DESIGN CONTROL

1. Approved procedures provide for performing the design process in a planned, controlled and documented manner. The design control process includes the Integrated Safety Analysis and Management Measures.

2. Design inputs, such as design bases, performance requirements, regulatory requirements, codes and standards, are identified and documented as design requirements (e.g., primary requirements, functional requirements, and system requirements). Design requirement documents are reviewed and approved on a timely basis and to the level of detail necessary to permit the design activity to be carried out correctly and to provide a consistent basis for making design decisions, accomplishing design verification measures, and evaluating design changes. Changes, including the reason for the changes, and whether or not prior NRC approval is required to make the changes, are identified, approved, documented, and controlled.

3. Design process activities are planned on a timely basis and to the level of detail necessary to permit the design process to be carried out correctly; permit verification that the design inputs are correctly translated into design documents; and to support interfacing design, procurement, fabrication, construction, and operation. Appropriate quality standards are identified and documented. Changes from specified quality standards, including the reasons for the changes, and whether or not prior NRC approval is required to make the changes, are identified, approved, documented, and controlled. Design methods, materials, parts, equipment, and processes that are essential to the function of the IROFS are selected and reviewed for suitability of application. Assemblies, subassemblies and parts are clearly identified. Commercial grade items that have been modified or which need to meet special verification requirements are uniquely identified.

4. Final design output documents, including changes thereto, are relatable to the design input by documentation in sufficient detail to permit design verification.

5. Design outputs that consist of computer programs are developed, validated, and managed in accordance with ASME NQA-1-1994, Basic Requirement 3 and Supplement 3S-1, "Quality Assurance Requirements of Computer Software for Nuclear Facility Application."

6. Design analyses documents (e.g., calculations) contain sufficient detail as to the purpose, method, assumptions, design input, references, and units such that a person technically qualified in the subject can understand the analyses and verify the adequacy of the results without recourse to the originator. Design analysis, performed with computer systems, shall list the software and version, hardware, inputs and outputs and evidence of computer program verification/validation or alternate verification of the results. Design analysis documents are identifiable by subject, originator, reviewer, and date or by other identification such that the documents are retrievable.

7. Design verification is performed and documented, in accordance with approved procedures, by competent individuals or groups other than those who performed the original design. The extent and method of the design verification is a function of the importance to safety, the complexity of

the design, the degree of standardization, the state of the art, past performance, and similarity with previous proven designs. Where changes to previously verified designs are made, design verification is performed for the changes, including an evaluation of the effects of the changes on the overall design and on any design analysis on which the design is based. Methods of design verification include any one or a combination of the following (as defined in Supplement 3S-1 of ASME NQA-1-1994): design reviews, alternate calculations, or the performance of qualification tests. Verification by testing is performed when deemed necessary and demonstrates adequacy of performance under conditions that simulate the most adverse design requirements. Verification of computer programs includes appropriate testing and validation. Design verification is performed in a timely manner (e.g., prior to release for use) and is completed in all cases prior to relying upon the IROFS, or computer program to perform its function.

8. Verifiers are knowledgeable in the areas to be verified. The verifier may be a supervisor, provided the supervisor was not directly responsible for the design (i.e., did not specify a singular design approach or rule out certain design consideration and did not establish the design inputs used in the design) or provided the supervisor is the only individual in the organization competent to perform the verification. However, verification is more than a cursory supervisory review. A supervisor with direct responsibility for the design may verify QL-2 or QL-3 designs.

9. Changes to final designs, field changes, modifications, and nonconforming items dispositioned "use-as-is" or "repair" are justified, documented, and subject to the design control measures commensurate with the original design. Changes are reviewed and approved by the person or group with assigned design authority. Changes to designs that have been approved or certified by the NRC (e.g., 10 CFR 71 package design) are subject to the necessary additional controls. When a significant design change is found to be necessary because of an incorrect design, the design process and verification procedure is reviewed and modified as necessary.

10. Internal and external design interfaces are identified and controlled and design efforts are coordinated among participating organizations. Design information transmitted across interfaces is reviewed, approved, documented and controlled. Incomplete, preliminary, or unverified design information is appropriately identified but not required to be collected, stored, and maintained.

11. Final design documentation and records that provide evidence that the design and design verification processes were performed in accordance with this section are collected, stored and maintained.

SECTION 4 PROCUREMENT DOCUMENT CONTROL

1. Procurement documents include those requirements necessary to assure that the items and services to be provided will be of the desired quality. These include the following as appropriate:

   a. Scope of Work

   b. Basic Technical Requirements — These include drawings, specifications, codes and industrial standards with applicable revision data; test and inspection requirements; special processes; and special requirements such as for designing, fabricating, cleaning, identification marking, erecting, packaging, handling, shipping, and storage

   c. QA Requirements — These include the requirements for the supplier to have an acceptable QA program consistent with the applicable portions of this QAPD (the requirement for the supplier to have a documented QA program may be waived for commercial grade items); provisions for access to the supplier's facilities and records for source inspection and audit; requirements for reporting

   d. Nonconformances and requesting changes; and provisions for extending applicable QA and other requirements of procurement documents to sub-tier suppliers

   e. Documentation Requirements — These include documents to be submitted for information, review or approval; instructions on record retention, turnover and disposition; and the requirements for delineating the technical and quality data required for ordering recommended spare and replacement parts and assemblies

2. Procurement documents and changes thereto are reviewed to ensure they include the appropriate requirements as listed above. The review and documented concurrence is performed by independent personnel having an understanding of the requirements and intent of the procurement document.

3. Changes to procurement documents, including changes made during bid review, contract negotiations or post award, are subject to the same control as the original document.

SECTION 5 INSTRUCTIONS, PROCEDURES, AND DRAWINGS

1. Activities affecting the availability and/or reliability of IROFS are prescribed by and accomplished in accordance with documented procedures, instructions, and drawings of a type appropriate to the circumstances. These documents include or reference appropriate acceptance criteria for determining that prescribed activities have been satisfactorily accomplished. Standard guidelines for the format, content, and review and approval processes are established.

2. The Gas Centrifuge QAPD establishes the policy requirements approved by the Director, Enrichment Technology. Procedures are the second tier of documents that implement the QAPD. Third tier Instructions provide specific step-by-step directions when deemed necessary. Procedure and Instruction preparation, review, and approval are the responsibility of the applicable manager. The QA organization reviews and approves selected QA implementing procedures for compliance and consistency with this QAPD.

3. Adherence to policy, procedures, and instructions is mandatory. In the case of conflict the higher tier document governs, unless the exception is approved otherwise.

4. Activities that require skills normally possessed by qualified personnel do not require detailed step-by-step delineation in a procedure. They are performed in accordance with documents of a type appropriate to the circumstances such as planning sheets, job descriptions, vendor manuals, or other form.

SECTION 6 DOCUMENT CONTROL

1. Documents and changes to documents that prescribe or specify quality requirements or activities affecting the availability and/or reliability of IROFS are controlled in a manner that assure the use of correct documents. Such documents, including changes thereto, are reviewed for adequacy and approved for release by authorized personnel.

2. Procedures and instructions assure that documents are prepared; reviewed for adequacy, correctness, and completeness by a qualified individual; approved for release by authorized personnel; distributed to the location where the activity is performed prior to commencing work; and used in performing the activity. Obsolete or superseded documents are removed or appropriately identified. Procedures identify documents to be controlled; responsibility for preparing, reviewing, approving, and issuing documents to be used; and require the establishment of current and updated distribution lists.

3. Changes to documents are reviewed and approved in the same manner as the original unless other organizations are specifically designated. Reviewing personnel have access to the pertinent background information upon which to base their approval. Procedures provide for simplified approval of editorial or inconsequential changes. Procedures describe the type of minor changes that do not require review and approval in the same manner as the original and who can authorize minor changes.

SECTION 7 CONTROL OF PURCHASED ITEMS AND SERVICES

1. The procurement of items and services is controlled to assure conformance with specified requirements. These controls provide for the following as appropriate: source evaluation and selection, evaluation of objective evidence of quality furnished by the supplier, source inspection, audit, and examination of items or services upon delivery or completion.

2. Procurement activities are planned and documented to assure a systematic approach to the procurement process. Procurement document control is described in Section 4.

Noncommercial Grade Items and Services

1. Supplier selection is based, in part, on a pre-award evaluation of capability to provide items or services in accordance with the requirements of procurement documents. The evaluation includes one or more of the following:

   a. An evaluation of the potential supplier's history of providing an identical or similar product that performs satisfactorily in actual use. The supplier's history shall reflect current capability.
   b. The potential supplier's current quality records supported by documented qualitative and quantitative information that can be objectively evaluated.
   c. The potential supplier's technical and quality capability as determined by a direct evaluation of the facility, personnel, and implementation of the supplier's quality assurance program. Supplier audits are conducted in accordance with Section 18. Supplier QA programs meeting the applicable requirements of accepted industry regulations or standards such as, NQA-1, ISO 9000 series, ANSI Z540-1, 10 CFR 50 Appendix B, or 10 CFR 830.120, are acceptable.
   d. USEC reviews and approves the results of recognized industry shared supplier audits, (i.e., third party audits such as the Nuclear Industry Assessment Committee (NIAC), etc.). The review ensures that the requirements in the previous c. above have been met.
   e. The supplier has an applicable valid "Certificate of Accreditation" issued by the National Voluntary Laboratory Accreditation Program (NVLAP) of the National Institute of Standards and Technology (NIST). When using this method, an implementation audit shall be performed in accordance with Section 18 of this program.
   f. The potential supplier maintains and implements a NRC approved QA program. When using this method, an implementation audit shall be performed in accordance with Section 18 of this program.
   g. The supplier maintains a valid ASME Code certification for the item or service being provided. When using this method, an implementation audit shall be performed in accordance with Section 18 of this program.

2. Suppliers with acceptable technical, quality and commercial qualifications are placed on the Approved Supplier's List (ASL) maintained by the QA organization. Retention on the list is based on performance. Suppliers that are not pre-qualified may be used with appropriate compensatory controls as agreed upon by the QA organization.

3. Bids are evaluated and unacceptable conditions are resolved prior to award of the contract. Depending on the type of procurement, bids are evaluated for technical response, quality assurance requirements, supplier personnel, supplier production capability, past performance, alternates and exceptions, as well as commercial, cost and schedule considerations as applicable. Communication interfaces are established with suppliers, as required to include:

   a. Establishing an adequate understanding between USEC and the supplier of the provisions and specifications of the procurement documents
   b. Requirements for the supplier to identify the methods and processes to be used by the supplier in fulfilling the requirements of the procurement
   c. Reviewing the supplier documents generated or processed during activities fulfilling procurement requirements
   d. Identifying and processing necessary change information
   e. Establishing methods for exchange of information with the supplier
   f. Establishing the extent of source surveillance and inspection activities

4. Supplier-generated documents required for submittal are reviewed for acceptability. Measures ensure that submittal of these documents is accomplished as required by the procurement documents. Evaluation depends on the type of documents submitted. The three categories are: engineering documents requiring USEC technical approval (e.g., shop drawings, test procedures), verification documents (e.g., test reports, inspection reports) and information documents (e.g., vendor manuals, parts lists).

5. Acceptability verification activities are based on quality level, complexity, and quantity of items or services provided.

6. Acceptance of items, including spare and replacement parts, includes one or more of the following methods:

   a. Certificate of Conformance — When this method is utilized, the following minimum criteria are met:

1. The certificate identifies the purchased material or equipment or purchase order number.
2. The certificate identifies the specific procurement requirements met.
3. The certificate identifies any procurement requirements that were not met and approved waiver.
4. The certificate is authenticated by a person responsible for this quality assurance function.
5. The procedures, used for the preparation, review, and approval of the certificate are described in the supplier's quality assurance program or the purchase order.
6. The validity of the supplier's certificates and effectiveness of certification system is verified, and the interval of verification is based on the supplier's past quality performance.

   b. Source Verification — When this method is utilized, it is performed at intervals consistent with the quality level and complexity of the item or service. This method provides plans to perform inspections, examinations, or tests at predetermined points. Source inspection may be performed at lower tier suppliers when necessary. Results may be utilized at receiving inspection.

c. Receiving Inspection — When this method is utilized, purchased items are inspected to verify conformance to procurement documents. This method verifies by objective evidence such features as proper configuration; identification; dimensional, physical, or other characteristics; freedom of damage from shipping; cleanliness; and review of supplier documentation when procurement documents require the documentation to be furnished.

d. Post-Installation Testing — When this method is utilized, post-installation test requirements and acceptance criteria are established in conjunction with the supplier, if necessary.

e. Supplier qualification and performance history. For QL-1 items, at least one of the other methods of acceptance is used.

7. Documented evidence of acceptability must be complete prior to placing an item in service. Controls are established for conditional release, such as for post-installation testing.

8. Acceptance of services is based on one or more of the following methods:

   a. Technical verification of data produced
   b. Surveillance and/or audit of the activity
   c. Review of objective evidence for conformance to procurement document requirements

9. Acceptance of services includes review of contractor deliverables (including documentation and records), determination of acceptability for project use, completion of acceptance testing, completion of startup testing, turnover, etc.

10. Supplier nonconformance is processed in accordance with Section 15. Supplier nonconformance consist of one or more of the following:

    a. Violation of technical or material requirement
    b. Violation of requirement of purchaser-approved supplier document
    c. Nonconformance that cannot be corrected by continuation of the manufacturing process or by rework
    d. Items that do not conform to the original requirements even though the item can be restored to a condition such that the capability of the item to function is unimpaired

11. Supplier nonconformance may be identified either by USEC or by the supplier. For supplier identified nonconformance, USEC expects a supplier recommended disposition and technical justification. Nonconforming items are not released for use until implementation of the disposition is verified, except under conditional release provisions. Records of supplier nonconformance are maintained.

Commercial grade items are subject to the following controls:

1. Changes to commercial grade items specified in design documents are subject to design control

measures in accordance with Section 3.

2. Supplier evaluation, when deemed necessary, is in accordance with Section 7.

3. Commercial grade items are identified in procurement documents by manufacturer's published product descriptions, in accordance with Section 4.

4. A commercial grade item is an item satisfying all of the following:

   a. Not subject to design or specification requirements that are unique to nuclear facilities;
   b. Used in applications other than nuclear facilities;
   c. Is to be ordered from the manufacturer/supplier on the basis of a specification set forth in the manufacturer's published product description (e.g., in a catalog).

5. As a minimum for acceptance of commercial grade items, receipt inspection, as described in 6. below, is performed to provide reasonable assurance that the item received is the item ordered. If designated by engineering, based on the complexity of the item or its importance to safety, one or more of the following may also be used:

   a. Special test or inspection
   b. Commercial grade survey of the supplier
   c. Source verification
   d. Acceptable supplier/item performance record

6. Receipt inspections are performed to determine that damage was not sustained during shipment, that the item received is the item ordered, that inspection and testing was performed by the supplier as required by engineering, to ensure conformance with manufacturer's published requirements, and to ensure that required documentation is received and is acceptable.

Commercial Grade Services

1. Methods for determining whether a service can be purchased as commercial grade and used in an ROFS application are established and implemented. A commercial grade service is a service satisfying all of the following:

   a. Not subject to design or specification requirements that are unique to nuclear facilities,
   b. Used in applications other than nuclear facilities, and
   c. Is to be ordered from the supplier on the basis of a specification set forth in the service provider's published service description or other appropriate documents.

2. The criteria and methods for identifying the characteristics (controls) for acceptance are established. The characteristics (controls), which once selected to be verified, provide reasonable assurance that the service provided meets specified requirements.

3. In selecting the controls, the impact of the activities associated with the service on the safety

function of plant equipment is considered.

4. Acceptance reviews will be performed, as a minimum, in accordance with item10 below for acceptance of commercial grade services to provide reasonable assurance that the service performed is the service ordered. If designated by Engineering, based on the complexity of the service or its importance to safety, one or more of the following may also be used for acceptance in addition to the acceptance review:

   a. Special tests and inspections
   b. Commercial grade survey
   c. Source verification
   d. Acceptable supplier service performance history for the service.

5. The selection of the method or combination of methods in 4. above is based on the following:

   a. Selected controls
   b. Available supplied information
   c. Quality history
   d. Degree of standardization of the service
   e. Importance to safety and complexity of the service.

6. Dedication of a commercial grade service occurs when that service is accepted in accordance with the above.

7. Source evaluation and selection, where deemed necessary by Engineering based on complexity and importance to safety, is in accordance with the requirements of Section 7.

8. Procurement documents are issued and controlled in accordance with the requirements of Section 4 of this QAP.

9. Commercial grade services are identified in the purchase order by the service provider's published service description (e.g., Supplier's bulletin describing standard calibration services that are provided by the supplier) or other appropriate documents.

10. Acceptance reviews are performed to determine the service performed is the service ordered and that required documentation is received and is acceptable.

SECTION 8 IDENTIFICATION AND CONTROL OF ITEMS

1. Controls are established to assure that only correct and accepted items are used or installed. Identification is maintained on the items or in documents traceable to the items, or in a manner that assures identification is established and maintained as described in this section.

2. Items are identified and controlled as necessary from initial receipt and fabrication of the items up to and including installation and use to assure that only correct and accepted items are used or installed. Physical identification is used to the maximum extent possible. When physical identification is either impractical or insufficient to control the item, physical separation, procedural controls, or other means are employed. When markings are used, measures are established to ensure that the markings are clear, legible and do not have a detrimental effect on the function or service life of the item. Markings are transferred to each part of an identified item when subdividing and are not to be obliterated by surface treatments or coatings unless other means of identification are provided.

3. Traceability of items to specific records is provided when specified by codes, standards or specifications.

4. Where specified, items having a limited operating life or shelf life are identified and controlled to preclude use of items whose operating life or shelf life has expired.

5. Procedures provide for item identification consistent with the planned duration and conditions of storage, such as:

   a. Provisions for maintenance or replacement of markings and identification records due to damage during handling or aging;
   b. Protection of identifications on items subject to excessive deterioration due to environmental exposure; and
   c. Provision for updating existing records. Documentation is provided to show that items released for use are the items specified.

SECTION 9 CONTROL OF PROCESSES

1. Processes affecting quality of items and services are controlled. Procedures, instructions, drawings, checklists, travelers, work orders or other appropriate means controls processes. These means assure that process parameters are controlled and that specified environmental conditions are maintained.

2. Special processes that control or verify quality, such as those used in welding, heat treating, and nondestructive examination, are performed by qualified personnel using qualified procedures in accordance with specified requirements, codes, or standards. When the outcome of the process is highly dependent on personal skills, such individuals are certified in accordance with specified requirements. When the outcome is highly dependent on control of process parameters, the process and equipment are pre-qualified, in accordance with specified requirements. Special process procedures prescribe the necessary equipment, process parameters, calibration and acceptance criteria.

3. Records are maintained of currently qualified personnel, processes, and equipment for special processes.

SECTION 10 INSPECTION

1. Planned inspections are performed as required to verify conformance of items or activities to specified requirements. Inspection personnel are qualified in accordance with Section 2. Personnel other than those who performed or directly supervised the work being inspected perform inspection for acceptance.

2. Inspection planning provides for hold points to ensure that work does not bypass required inspections. The hold points are established in work controlling documents. Work does not proceed beyond an inspection hold point without specific documented consent of the designated inspection representative.

3. The planning of inspection activities, methods, and attributes is based on the importance of the item or activity to be inspected; mandatory inspections required by codes, standards, regulatory requirements and commitments; the complexity of the item or activity; and the quality history of the process. Inspection planning includes characteristics to be inspected, responsibility, method, measuring and test equipment, acceptance criteria, and referenced instructions and design documents.

4. When a sample is used to verify acceptability of a group of items, the sampling procedure is documented and clearly identifies the sampling basis (typically based on recognized standard/practices).

5. If inspection of completed work is impossible or disadvantageous, indirect verification by process monitoring is provided. Both inspection and process monitoring are provided when necessary to ensure quality.

6. Final inspections include record review of the results and resolution of nonconformance identified by prior inspections. Acceptance by final inspection verifies conformance of the item to specified requirements.

7. Modifications, repairs, or replacements of items performed subsequent to final inspection require re-inspection or re-test, appropriate to the circumstances, to verify acceptability.

8. Inspection records contain the following as a minimum:

    a. Item inspected
    b. Date of inspection
    c. Inspector
    d. Type of observation and inspection plan
    e. Results or acceptability
    f. Action taken in connection with nonconformance.

SECTION 11 TEST CONTROL

1. Planned tests are performed as required to verify conformance with specified requirements, to demonstrate satisfactory performance, or to collect data. Tests include design verification tests, acceptance tests, pre-operational tests, post-maintenance tests, and operational tests. Planning for tests may include mandatory hold points as required.

2. Test procedures contain the following information as appropriate to the test:

   a. Test purpose or objectives, responsibilities, characteristics to be tested, hold points and test methods to be employed
   b. References and related documents
   c. Provisions for ensuring that prerequisites for a given test have been met - these include, as applicable: calibrated instrumentation, appropriate equipment, trained personnel, condition of test equipment and the item to be tested, and provisions for data acquisition
   d. Adequate instrumentation is available and suitable environmental conditions are maintained
   e. Provisions for documenting and evaluating the test results for conformance with acceptance criteria

3. In lieu of written test procedures, appropriate sections of related documents, such as ASTM methods, vendor manuals, maintenance instructions, or approved drawings or travelers with acceptance criteria may be used. Such documents must include adequate instructions to ensure the required quality of work.

4. Test records contain the following information: item tested, test date, tester or data recorder, type of observation, test procedure, results and acceptability, actions taken in connection with any deviations noted, and person evaluating the results.

5. Computer Program Testing is carried out in accordance with ASME NQA-1-1994, Basic Requirement 11, "Test Control," and Supplement 11S-2, "Supplementary Requirements for Computer Program Testing."

SECTION 12 CONTROL OF MEASURING AND TEST EQUIPMENT

1. M&TE used in activities affecting the availability and/or reliability of IROFS are controlled, calibrated, and adjusted at specified intervals to maintain equipment performance within required limits. Procedures ensure that devices and standards used for measurement, tests, and calibration activities are of the proper type, range and accuracy. Calibration control is not necessary for rulers, tape measures, levels, and other such devices.

2. A list of devices is established to identify those items within the calibration control system. This identification listing includes, as a minimum, the due date of the next calibration and any use limitations (when it is calibrated for limited use).

3. M&TE is calibrated at specified intervals or prior to use against equipment having a known valid relationship to nationally recognized standards. If no nationally recognized standard exists, the basis for calibration is documented. M&TE is properly handled and stored to maintain accuracy.

4. When M&TE is found to be out of calibration, as-found data are recorded and an evaluation is made and documented as to the validity of previous inspection and test results and of the acceptability of items previously inspected or tested. Out-of-calibration devices are tagged or segregated and are not used until re-calibrated. When M&TE is consistently found to be out of calibration, it is repaired or replaced. Also, calibrations are performed when personnel performing measurements and tests deem the accuracy of the equipment suspect.

5. Records are maintained and equipment is suitably marked or otherwise identified to indicate its calibration status.

SECTION 13 HANDLING, STORAGE AND SHIPPING

1. Material and equipment are handled, stored and shipped in accordance with design and procurement requirements in a manner that will minimize damage, deterioration, or loss.

2. Special coverings, equipment, and protective environments are specified and provided where necessary for the protection of particular items from damage or deterioration. When such special protective features are required, their existence is verified and monitored as necessary to ensure they continue to serve the intended function.

3. Special handling tools and equipment are provided where necessary to ensure items can be handled safely and without damage. Special handling tools and equipment are controlled and maintained in a manner such that they will be ready and fit to serve the intended function when needed. Such control includes periodic inspection and testing to verify that special handling tools and equipment has been properly maintained. Operators of special equipment are experienced or trained as required.

4. Attention is given to marking and labeling items during packaging, shipment, and storage. Additional marking or labeling is provided as necessary to ensure that items can be properly maintained and preserved. This includes indication of the presence of special environments or the need for special control.

5. Special handling, preservation, storage, cleaning, packaging, or shipping instructions are established and used when essential to maintain acceptable quality.

SECTION 14 INSPECTION, TEST, AND OPERATING STATUS

1. Procedures are established to ensure that the status of inspection and test activities are either marked or labeled on the item or in documents traceable to the item. This activity is required when it is necessary to ensure that required inspections and tests are performed, and to ensure items, that have not passed the required inspections and tests, are not inadvertently installed, used, or operated.

2. Status indicators, such as physical location and tags, markings, work controlling documents, stamps, inspection records, or other suitable means are utilized when required. This includes indicating the operating status of systems and components, such as by tagging valves and switches, to prevent inadvertent operation. Authority for the application and removal of tags, markings, labels, and stamps, is specified.

SECTION 15 CONTROL OF NONCONFORMING ITEMS

1. Items and related activities that do not conform to specified requirements are controlled to prevent inadvertent installation or use.

2. Nonconforming items are identified in a manner that does not adversely affect the end use of the item, by markings, tagging, and other appropriate methods.

3. Nonconforming items are segregated, when practical, by placing them in a clearly identified and designated area until properly dispositioned. When segregation is impractical or impossible due to physical conditions such as size, weight, or access limitations, other measures are employed to preclude inadvertent use of the item.

4. Nonconforming items are reviewed and dispositioned as "reject," "rework," "repair," or "use-as-is." Further processing, delivery, installation or use of the nonconforming item is controlled pending an evaluation and approved disposition by authorized personnel, and documented notification to affected organizations is provided.

5. The responsibility and authority for the evaluation and disposition of nonconforming items is defined. The personnel performing evaluations to determine the dispositions have demonstrated competence in the specific area they are evaluating, have an adequate understanding of the requirements, and have access to pertinent background information. The disposition of nonconforming items is identified and documented as required to carry out the disposition. Technical justification for the acceptability of nonconforming items dispositioned "repair" or "use-as-is" is documented and subject to design control measures as described in Section 3. The disposition process includes consideration of the need for design documents to be "as-built" to facilitate operations, maintenance, or modification. The as-built records, if the disposition determines such records to be required, reflect the accepted deviation.

6. Repaired or reworked items are re-examined in accordance with the original acceptance criteria unless the nonconforming item disposition has established alternate acceptance criteria.

7. Nonconformance documentation identifies the nonconforming item, describes the nonconformance, contains the disposition and any re-inspection requirements, and contains the signature(s) approving the disposition.

SECTION 16 CORRECTIVE ACTION

1. Conditions adverse to quality are identified and corrected as soon as practical. In the case of a significant condition adverse to quality, the cause of the condition is determined and corrective action is taken to preclude recurrence. This action is documented, reported to appropriate levels of management, and follow-up action is taken to verify implementation of this corrective action.

SECTION 17 QUALITY ASSURANCE RECORDS

1. The quality assurance records system ensures that records are specified, prepared and maintained in a manner to provide protection and retrievability. Design specifications, procurement documents, test procedures, operational procedures, or other documents specify the records to be generated, supplied, or maintained.

2. Records are considered valid when they are complete, identified, authenticated and legible. Documents are considered valid records only if stamped, initialed, or signed and dated by authorized personnel or otherwise authenticated. Lifetime records are entered into record storage after receipt or validation. Temporary storage in approved containers is provided until records are entered into lifetime storage. Nonpermanent records are retained by the responsible organization until they are no longer useful.

3. Lifetime records are defined in accordance with ASME NQA-1-1994, Supplement 17S-1, "Supplementary Requirements for Quality Assurance Records," Section 2.7.1. The applicable document that specifies the record indicates those to be forwarded for lifetime storage. In the case of specified records produced by suppliers, an agreement for records turnover is established.

4. Lifetime records are retained for the life of the item to which they apply or as required by a regulatory agency. An indexing system ensures the record can be retrieved. Storage is in a central location unless the applicable procedure specifies otherwise. Records may be originals, copies, or electronic format.

5. Corrections to records are approved by the originating organization. The corrections include the date and the identification of the individual authorized to issue the correction.

6. Custodianship responsibility is assigned for lifetime records storage. Custodianship includes receipt and status control, storage, preservation, and safekeeping using hard copy, microfilm, or electronic document management system.

7. Storage facilities minimize the risk of loss or deterioration of lifetime records. Hard copy or microfilm storage facilities meet the requirements of ASME NQA-1-1994, Supplement 17S-1, "Supplementary Requirements for Quality Assurance Records," Section 4.4. For electronic storage, backups or duplicate files are generated. Lost or damaged records are replaced, unless deemed impractical with the concurrence of the QA Organization.

8. Single copy records are checked out of storage only if they cannot be copied and then only for a limited period. Temporary protection in such cases is provided by prudent business practices (e.g., record of custody, office environment, work place security).

SECTION 18 AUDITS

1. Planned and scheduled audits are performed by the QA Organization to verify compliance with all aspects of the QA program and to determine its effectiveness. Internal audits of organizational units performing quality program activities and external audits of QL-1 suppliers are performed at a frequency commensurate with the status and importance of the activity. Third party audits may be used to satisfy the supplier audit requirement. QL-2 and QL-3 suppliers need not be audited provided their performance continues to be acceptable. Regularly scheduled audits are supplemented by additional audits/assessments of specific subjects when necessary to provide adequate coverage.

2. The audit is conducted in accordance with a documented procedure. A plan is prepared for each audit to identify the audit scope, requirements, audit personnel, activities to be audited, applicable documents, organizations to be audited, schedule and written procedures or checklists.

3. The audit team contains one or more auditors, one being designated lead auditor who prepares, organizes, and directs the audit; coordinates the preparation and issuance of the audit report; and evaluates responses. Auditors (including technical specialists) have experience commensurate with the scope, complexity, or special nature of the audit. The lead auditor is qualified in accordance with Section 2.

4. Audits are performed in accordance with checklists or equivalent. Organizations being audited provide access and assistance to the audit team. Objective evidence is examined to determine if the QAPD elements are being implemented effectively. The primary focus is on the quality of results (compliance with specified acceptance criteria), with procedural compliance as a secondary focus. Conditions requiring prompt corrective action are reported immediately to management of the audited organization. The results of the audit are discussed with management of the audited organization.

5. The audit report is signed by the lead auditor and issued to the appropriate levels of management.

6. The audit report includes the following information, as appropriate:

   a. Description of the audit scope
   b. Identification of the auditors
   c. Identification of persons contacted during audit activities
   d. Summary of audit results, including a statement on the effectiveness of the QA program elements audited
   e. Description of each reported adverse audit finding in sufficient detail to enable corrective action to be taken by the audited organization

7. Management of the audited organization or activity investigates adverse audit findings, schedules corrective action, including measures to prevent recurrence, and notifies the QA Organization in writing of action taken. Adequacy of audit responses is evaluated by the QA organization and

verification of corrective action is documented.

8. Follow-up action is taken by the QA Organization to verify the implementation and effectiveness of the corrective action and to determine if repetitive problems require further corrective action in accordance with Section 16. Audit records include audit plans, audit reports, written replies, and the record of completion of corrective action.

SECTION 19 PROVISIONS FOR CHANGES

1. QAPD changes are controlled by 10 CFR 70.72, "Facility Changes and Change Process." QAPD changes may be initiated by events such as reorganizations, revised activities, as a result of lessons learned, changes to applicable regulations, process changes, or other reasons. QAPD changes are governed by approved procedures.

Figure 1, Lead Cascade Construction/Start-up Organization

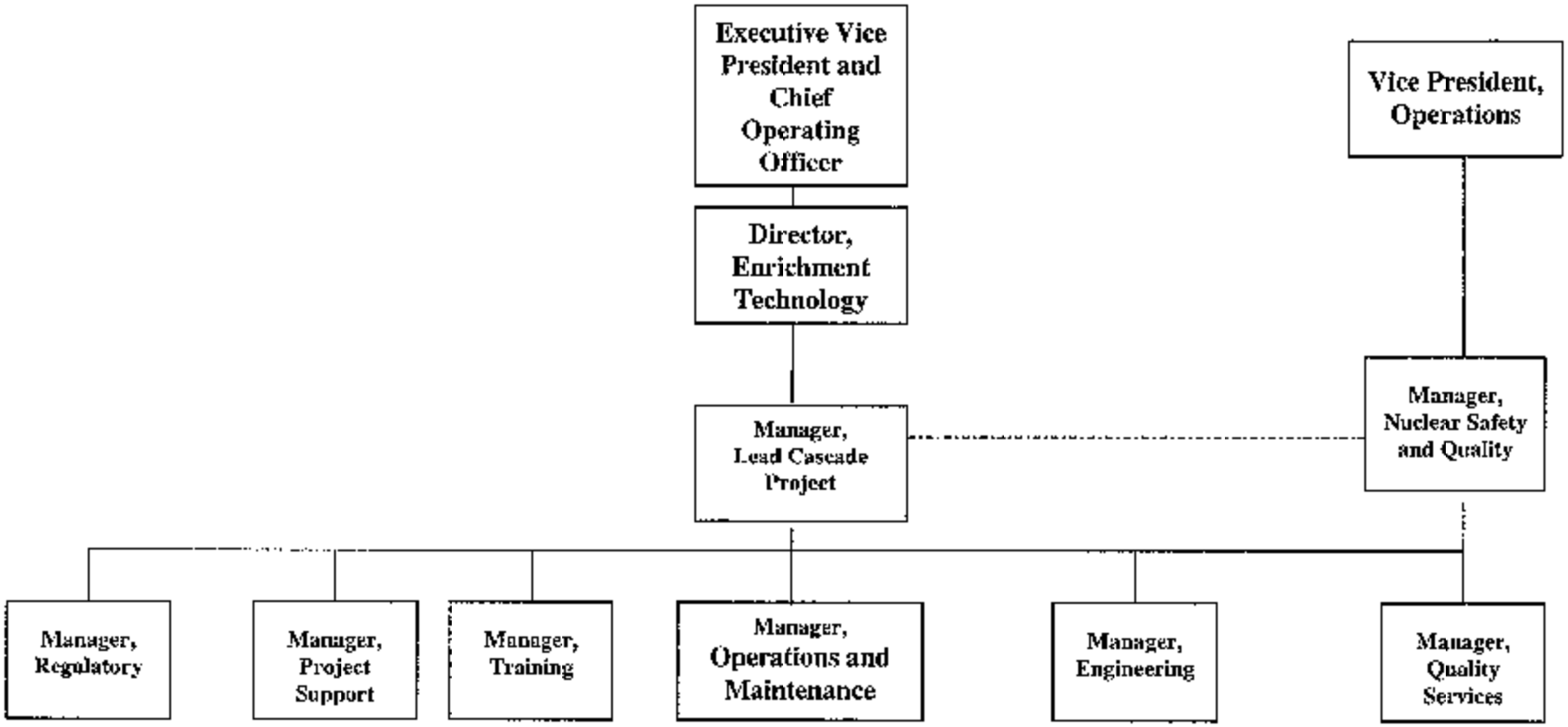

Figure 2, Lead Cascade Operating Organization